



Flying Operations

C-17 OPERATIONS PROCEDURES

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SUMMARY OF REVISIONS:

Change 1 to AFI 11-2C-17 Volume 3, 1 January 2001, adds a reference to AFI 11-2C-17V3, ADDENDA B, *C-17 Special Operations* and associated checklists. **POSTING**

INSTRUCTIONS: Users should print Change 1 using duplex head-to-head printer settings and replace the appropriate pages. Change 1 replaces pages 1-2.

Change 2 to AFI 11-2C-17 Volume 3, 1 January 2004, removes and replaces chapter 4, *Aircraft Operating Restrictions*, and chapter 24, *Night Vision Goggle Operations (NVG)* in their entirety.

This instruction contains references to Air Mobility Command (AMC) and Multicommand (MC) Forms, which, until converted to departmental level publications and forms, may be obtained from the AMC publications' web home page or from the AMC Publishing Office:

Publications: AMCI 11-301, AMCMAN 11-211, AMCP 55-25, AMCRs 3-2V2, 28-2, 55-18, 55-20, 55-25, 55-79, and AMCVA 36-2206.

Forms: AMC Forms 38, 41, 43, 54, 97, 148, 181, 196, 305, and 423.

AFI 11-2C-17V3, ADDENDA A, *Configuration and Mission Planning*

SUPPORTING CHECKLISTS:

AFI 11-2C-17V3CL1, *Formation Air Refueling Procedures*

AFI 11-2C-17V3CL2, *C-17 Loadmaster Passenger Briefings*

AFI 11-2C-17V3CL3, *Pilot Combat Operations Guide*

AFI 11-2C-17V3CL4, *Loadmaster Combat Checklists*

AFI 11-2C-17V3CL5, *C-17 Pilot Airdrop Briefing Guides and Checklists*

AFI 11-2C-17V3CL6, *C-17 Loadmaster Airdrop Checklists*

AFI 11-2C-17V3CL7, *Mission Briefing Guides*

AFI 11-2C-17V3CL8, *Preflight and Post Mission AEC Checklist*

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Chapter 1

GENERAL INFORMATION

1.1. General.

1.1.1. This AFI provides guidelines for C-17 operations and applies to Air Force C-17 aircrews and all management levels concerned with operation of the C-17. It is a compilation of information from aircraft flight manuals, FLIP publications, and other Air Force directives, as well as an original source document for many areas. When specified as the reference, the basic source directive has precedence in the case of any conflicts, revisions, and matters of interpretation. For those areas where this AFI is the source document see paragraph 1.4. for the appropriate waiver authority. Where areas of this AFI repeats information in other source documents, waiver authority will be in accordance with these source documents.

1.1.2. All units and agencies involved in or supporting C-17 operations will use this AFI. Copies will be current and available to planning staffs from headquarters to aircrew level. Maintain a copy of this AFI at mobility transportation and base operations passenger manifesting agencies.

1.2. Applicability. This AFI is applicable to all individuals and units operating C-17 aircraft. Copies should be available to all aircrew members operating the C-17.

1.3. Key Words Explained.

1.3.1. "Will" and "shall" indicate a mandatory requirement.

1.3.2. "Should" is normally used to indicate a preferred, but not mandatory, method of accomplishment.

1.3.3. "May" indicates an acceptable or suggested means of accomplishment.

1.3.4. "Note" indicates operating procedures, techniques, etc., which are considered essential to emphasize.

1.3.5. "Caution" indicates operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.

1.3.6. "Warning" indicates operating procedures, techniques, etc., which could result in personal injury or loss of life if not carefully followed.

1.4. Deviations and Waivers. Do not deviate from the policies and guidance in this AFI except for safety, or when necessary to protect the crew or aircraft from a situation not covered by this AFI and immediate action is required. The aircraft commander is ultimate authority and is responsible for the course-of-action to be taken. Report deviations or exception without waiver through channels to MAJCOM Stan/Eval function who, in turn, should notify the OPR (lead command) for follow-on action, if necessary.

1.4.1. Unless otherwise directed in this AFI, waiver authority for the contents of this document is the MAJCOM/DO. MAJCOM/DO staff should forward a copy of approved waivers to the OPR (lead command). Request for a long-term (permanent) waiver must be approved by MAJCOM/DO and listed in MAJCOM supplement (see paragraph 1.5.).

3.10.2.4 Initiate interfly approval request by the unit or agency requesting the agreement by memo or message format to the OG/CC controlling the resource. Each commander involving resources (personnel or aircraft) (or MAJCOM, if appropriate) must concur with interfly proposal. Request must include details of the deployment or mission including; aircrew name(s), duration, or special circumstances.

3.10.2.5. Flight Mishap accountability is MAJCOM designated PEID code for mishap aircraft.

3.10.2.6. Ground Mishap accountability in accordance with AFI 91-204, *Safety Investigations and Reports*.

Chapter 4

AIRCRAFT OPERATING RESTRICTIONS

4.1. Objective. Redundant systems may allow crews to safely perform some missions when a component/system is degraded. The Aircraft Commander (AC) is the final authority in determining the overall suitability of an aircraft for the mission. The AC will ensure a detailed explanation of the discrepancy is entered in the AFTO Form 781A, **Maintenance Discrepancy and Work Document**; include the following maintenance identifiers to effectively communicate aircraft status:

4.1.1. Mission Essential (ME). The AC will designate an item, system, or subsystem component essential for safe aircraft operation as ME.

4.1.2. Mission Contributing (MC). The AC will designate an item, system, or subsystem component, which is not currently essential for safe aircraft operation as MC. These discrepancies should be cleared at the earliest opportunity. If circumstances change or mission safety would be compromised, re-designate as ME. Do not delay a mission to clear a MC discrepancy.

4.1.3. Open Item (OI). The AC will designate discrepancies not expected to adversely impact the current mission or any subsequent mission as an OI. These items are normally cleared at home station.

4.2. Minimum Equipment List (MEL) Policy. The MEL is a pre-launch document that lists the minimum equipment/systems to operate the aircraft. It is impractical to prepare a list that would anticipate all possible combinations of equipment malfunctions and contingent circumstances. Consider equipment/systems with no listed exceptions as grounding items. An AC who accepted an aircraft with degraded equipment/systems is not committed to subsequent operations with the same degraded equipment. ACs are not committed to operations with degraded equipment accepted by another AC.

4.2.1. The AC shall account for the possibility of additional failures during continued operation with inoperative systems or components. The MEL is not intended for continued operation over an indefinite period with systems/subsystems inoperative.

4.2.2. All emergency equipment will be installed unless specifically exempted by mission requirements/directives.

4.2.3. Waiver Policy. An AC prepared to operate with a degraded MEL item shall request a waiver through C2 channels. The AC shall provide the C2 agent: 1) nature of request, 2) individual crew member qualification, 3) mission leg(s) requiring the waiver, and 4) the governing directive of waiver request to include volume, chapter, or paragraph. Initiate waiver requests as soon as possible; plan at least a 1-hour waiver process time.

4.2.4. ACs operating with waiver(s) for degraded equipment shall coordinate mission requirements (i.e., revised departure times, fuel requirements, maintenance requirements, etc.) with the controlling C2 agency.

4.2.5. If beyond C2 communication capability, or when it is necessary to protect the crew or aircraft from a situation not covered by this chapter and immediate action is

required, the AC may deviate according to Paragraph 1.4. Report deviations (without waiver) through channels to MAJCOM/DO within 48-hours. OG/CCs shall collect background information and submit a follow-up written report upon request.

4.3. Waiver Protocol. Waivers to operate with degraded equipment are granted on a case-by-case basis. The AC determines the need for a waiver after coordinating with the lowest practical level of command. MEL waiver authority is as follows:

4.3.1. Training Missions. OG/CC or equivalent with mission execution authority.

4.3.2. MAJCOM Directed Missions. MAJCOM/DO with mission execution authority for active duty, AFRC, or ANG units flying MAJCOM-directed missions (includes Operational Readiness Inspections). Initiate the request with MAJCOM C2 agency. For AMC-directed missions contact HQ AMC/DOV through TACC.

4.3.3. Contingency Missions. DIRMBOFOR (or equivalent) for the agency with C2, if not specified in the OPORD/Tasking Order.

4.3.4. ANG or AFRC Directed Missions. ANG or AFRC maintains C2 and waiver authority for ANG or AFRC directed mission prior to mobilization.

4.3.5. Other Than MEL Waivers. Determine governing source document (i.e. AFI, Flight Manual, Maintenance T.O., etc.) to ascertain the waiver authority. Use C2 channels to notify the appropriate waiver authority. Waivers of this nature may require an extended response time.

4.4. Technical Assistance. The AC may request technical support and additional assistance from their home unit or MAJCOM C2 agency. See **FCB** for appropriate telephone numbers.

4.5. MEL Table Definitions/Column Identifiers. MEL tables are arranged by aircraft system to provide the AC a mechanism to determine minimum system requirements. Components are listed by number installed and minimum required for flight. Requirements are defined by Home Station Mission Originator (Column A) and en route (Column B). Local training missions, to include off-station trainers, fall under Column B. An asterisk (*) in the Required column indicates the number required is situation dependent; refer to the Remarks/Limitations/Exceptions column for clarification.

4.5.1. Remarks/Limitations/Exceptions. Some technical information and procedures are contained in this column. This is not all-inclusive; crewmembers shall refer to the flight manual and other directives for procedures, techniques, limitations, etc.

4.5.2. One-time Flight Clarification: Normally a Red X discrepancy downgraded for a one-time flight without passengers. The LG/CC who owns the aircraft is the approval authority. Cargo may be carried as long as safety-of-flight is not compromised. The priority is to move the airplane to a repair capable facility; once repaired, the mission can be completed. ACs must coordinate with appropriate agencies to ensure repair capability exists at the destination. One-time flights may include en route stops only when necessary to recover the airplane. **Example:** An airplane departs on a gear-down flight from Djibouti IAP and requires an en route fuel stop (Cairo) before landing at the nearest repair capable facility, Sigonella AB.

4.5.3. One-time flight to nearest repair capable facility: Flight is limited to the nearest (shortest en route time) repair capable base.

4.5.4. One-time flight to a repair capable facility: Same as 4.5.3. except the flight is not restricted to the nearest repair capable facility.

4.5.5. Other Mission and Repair Clarifications:

4.5.5.1. Shall be repaired at next repair capable facility: Mission may continue as scheduled; item shall be repaired upon reaching a repair capable facility. Designate item ME upon reaching repair facility. Once maintenance action is initiated, and it is determined repairs are not possible, the AC will discuss possible courses of action with command and control. Enroute repair capable facilities are deemed so regardless of parts availability. **Example:** If Yokota AB did not have the required part, the aircraft is not cleared to proceed without a waiver.

4.5.5.2. Repair as soon as practical: Item should be repaired when ground time permits. Do not delay the mission even if at a maintenance capable facility.

4.5.5.3. Mission may continue: Regardless of location, do not delay the mission, continue as scheduled. Item is designated MC; repair per paragraph 4.1.2.

4.5.5.4. Mission dictates requirement: Consider entire mission not just the next leg. **Example:** An airplane is departing an en route station with maintenance capability, after engine start it is discovered that the #1 engine anti-ice is inoperative. Icing conditions are not forecasted for the next leg. However, because the mission spans several days and repair capability does not exist at the scheduled en route stops, the AC elects to have the item repaired prior to departing.

4.6. C-17 MEL. This MEL applies to all C-17 models and lists the minimum equipment and systems to launch the aircraft under routine operations. The MEL does not include all equipment or systems essential to airworthiness. The MEL is not intended to promote continued operation of the aircraft for an indefinite period with systems/subsystems inoperative. See this chapter for further information including objectives, policy, and waiver protocol. Additional guidance specific to SOLL operations are listed in **Addenda B, C-17 Special Operations**.

4.7. Supplements. Each MAJCOM may supplement the MEL (see Chapter 1).

4.8. Navigation Systems.

4.8.1. Equipment listed in FLIP for permitting compliance with MNPS is mandatory. Loss of any component before airspace entry requires return to a station with maintenance capability or re-filing via routes permitting equipment degradation.

4.9. Gear Down Flight Operations. During peacetime, gear down flight operations will be limited to those sorties required to move the aircraft to a suitable repair facility. Gear down flight should only be considered and approved after all avenues to repair the aircraft have been exhausted. Each gear down sortie will be approved by the MAJCOM/DO.

Table 4.1. Air Conditioning/Pressurization

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Air Conditioning Pack	L or R Pack "Disagree"	2	2	1	These requirements include the H2O Separator, Flow Control Valve, Turbine Bypass Valve, H2O Injector Nozzle, and Air Cycle Machine. All equipment will be operable on the same side as the operable pack if one pack is inop
Ram Air Ventilation Valve		1	0	0	Both packs will be operational if inop
Ram Air Doors For Air Conditioning Pack		2	1	1	These requirements cover Exhaust Ram Air Valve, Actuator, Linkages and cables. Inop Ram Air Inlet Door will be wired open
Pack Discharge Pneumatic Thermostat		2	1	1	Will be operational on operating pack
Pack Discharge Temperature Sensor		4	2	2	Will be operational on operating pack
L/R Pack DISAG Switch		2	1	1	Operable switch will correspond to operating pack
HI Flow On Switch		1	0	0	Avionics Cooling Override Switch will be operational if HI-Flow Switch is inop
Remote Temp Control Switch		1	0	0	Loadmaster Temp Control Selector will be operational if Remote Temp Controller Switch is inop
Inlet Air Temperature Sensor		6	3	3	One sensor per zone will be operational
Zone Temperature sensor		6	3	3	One sensor per zone will be operational
Environ Control Panel, Bleed/Supply/Compt Temp Indicator		8	0	0	
Cargo Compartment Recirculation Fan		1	1	0	Will be operable if one pack is inop
Environmental System Controller (ESC)		2	2	2	Enroute, if one ESC is inop, continue to a station with repair capability
Cargo Compartment Exhaust Fan		2	0	0	
Trim Air Regulator		2	1	1	These requirements cover the Trim Air Differential Pressure Sensor. Inop, valve will be locked closed. All associated equipment will be operational on same side as operational trim air regulator
Trim Air Check Valve		3	2	2	Center check valve may be inop
Flt Deck Overhead Panel Trim Air Switch		1	0	0	
Cargo Compt AC Supply Check Valve		4	2	2	One per side required, inop valve will be closed

Table 4.1. Air Conditioning/Pressurization (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Air Conditioning Outlet Air Valve		13	0	0	
Avionics Cooling Fan		3	2	2	These requirements cover the Avionics Cooling Check Valve
Avionics Ground Cooling Inlet Filter Assembly		1	0	0	Will have filter installed for ground operation of avionics equipment
Avionics Cooling Differential Pressure Sensor		2	1	1	
Avionics Cooling Inflow Valve		1	0	0	
Ground Inlet Shutoff Valve		1	0	0	Will be manually closed for flight if inop
Avionics Cooling Heat Exchanger		1	0	0	Will have air conditioning pack operating for ground ops. Valve will be manually locked open if heat exchanger is inop
Avionics Cooling Equipment Air Shutoff valve Assembly		10	0	0	Valve required to be closed if corresponding avionics equipment is not installed
Ramp Temperature Sensor		1	0	0	
Environmental System-Fire Detection Control Panel	ENV PANEL INOP/SINGLE	1	1	1	These requirements cover the Trim Air OFF/DIS Switchlight.
LM Station Temperature Control Panel		1	0	0	Remote Temp Control Switch on ESCP will be operational.
Environ Control Panel APU Air Switch		1	0	0*	Required if no air cart available for engine start
Cabin Pressure Outflow Valve		1	1	1	These requirements include the Outflow Valve Actuator.
Cabin Pressure Controller	AUTO PRESS INOP/SINGLE	2	1	1	These requirements include Cabin Pressure Sensor and Outflow Valve Motor. One complete cabin pressure system will be operational
Positive Pressure Relief Valve		3	2	2	These requirements include the Positive Pressure Relief Valve Filter Assembly.
Negative Pressure Relief Valve		3	2	2	
Cabin Pressure Indicator Unit		1	1	1	Two of three indicators in panel will be operational
Cabin Differential Pressure Sensor		1	1	1	

Table 4.1. Air Conditioning/Pressurization (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
10000 Ft Pressure Warning Aneroid Switch		1	1	1	
Cabin Pressure Gauge (crew entry door)		1	1	0	If inop, comply with T.O. 1C-17A-1, Section II warning
Cabin Differential Pressure Indicator (cockpit)		1	1	1	
Cabin Altitude Rate of Climb		1	0	0	
Cabin Altitude Indicator		1	1	1	
Cargo Floor Heat		1	0	0	
Ramp Floor Heater/Blower		2	2	1	
Temperature Control			Req	Req	Auto or manual control. Remote Temp Control Switch may be inop if LM Temp Control is operational

Table 4.2. Anti-Ice

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Wing Ice Protection System (Includes valves, cockpit switch, temp sensor)		2	2	0*	Will be operational for flights into known or forecast icing. Failed valve will be locked closed.
Engine Anti-Ice Systems (Includes valves, cockpit switches, temp sensors)		4	4	0*	Will be operational for flights into known or forecast icing. If icing is anticipated, manually open Shutoff Valve after associated engine has been started.
Low Temp Cowl Ice Protection Sensor		4	4	0*	Will be operational for flights into known or forecast icing.
Air Data Sensor Heating		31	31	0*	Will be operational for flights into known or forecast icing.
Windshield Ice Protection		2	2	0*	Will be operational for flights into known or forecast icing.
Window Defog Control Box		1	1	1	
Windshield Wipers		2	2	0*	Required for flight through rain.
Ice Detector Probe		1	1	0	Crew will monitor for ice if inop.

Table 4.3. Equipment and Furnishings

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Lavatory		1	1	1	Continue mission (if practical) to a facility with repair capability. Can be inop with comfort pallet onboard.
Potable Water System		1	0	0	If inop, ensure adequate supply of water
Refrigerator		1	0	0	

Table 4.4. Communications

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Communications Control Unit (CCU)	CCU FAULT X	2	2	2	A one time flight with one inop to a station repair capability is authorized.
Comm/Nav Control Panel (CNC)		2	2	1	
Control, Intercommunications Set (ICS)		7	4	4	Pilot's, copilot's, forward and aft loadmaster's intercom control sets (2341CT) will be operational. The Aft loadmaster ICS will be operational for backing, CDS, and personnel airdrop.
Comm 1		1	1	1	
Comm 2 / UHF / VHF		3	3	2	
Public Address System		1	1	0	When carrying passengers, will be operational unless other means of communication is available
HF Radios		2	0	0	As mission dictates for airspace
SURECOMM		1	0	0	

Table 4.5. Fire Protection

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Fire Detection System, Engine		4	4	4	Either loop A or B for each engine will be operational.
APU Fire Detection Sys		1	1	0	Either loop A or B will be operational. If inop the APU may not be used.
Smoke Detector, Cargo Compartment	Does not pass test	14	6	6	Sensors 9, 10, 13 & 14 plus two others will be operable
Lavatory Smoke Detector	Does not pass test	1	0	0	
Crew Rest Smoke Detector	Does not pass test	1	0	0	
Avionics Smoke Detector	Does not pass test	2	1	1	
IRU Smoke Detector	Does not pass test	4	4	3	Must correspond to inop IRU
Fire Bottle, Engine	"Agent Low"	4	4	4	A one-time flight to a station with repair capability is authorized.
Fire Bottle, APU		1	1	0	If inop then APU may not be used.

4.6. Electrical

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Integrated Drive Generators (IDG)	"GEN/OFF" Switchlight Illuminated	4	3	3	With two inop, one time flight to a station with repair capability is approved.
AC X-TIE		1	1	1	If inop, continue mission to a repair facility provided 4 IDG's and all AC bus ties are operational. If operating with 3 IDG's or any AC bus tie is failed, a one-time flight to a station with repair capability is authorized.
AC BUS TIE Relays		4	4	4	With one inop and all IDGs operational, a one time flight to a station with repair capability is authorized.
DC Cross Tie		1	1	1	
DC BUS TIE Relays		2	2	2	With one inop and transformer rectifiers operational, a one time flight to a station with repair capability is authorized.
Transformer Rectifiers		4	3	3	DC X-TIE and both DC Bus Ties will be operational.
AC Instrument BUS Transformers		2	1	1	Operational transformer will be installed on bus #3.
Emergency Power Generation					
Batteries		2	2	2	
Static Inverter		1	1	1	
Transfer Buses	AC XFER BUS	2	2	2	
Emergency Power Relays		2	2	2	
Battery Chargers	BATT NOT CHARGING	2	2	2	
Loadmaster Buses 1 and 4	LM 1, or 4 BUSES		Req	Req	
External Power		1	1	0	External power is required for Aeromedical Evacuation Mission.
60hz Power Supply System		1	1	0	Will be operational for Aeromedical Evacuation Missions

Table 4.7. OBIGGS

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
OBIGGS Systems		2	0	0	As required for mission tasking and tank inerting requirements.

Table 4.8. Flight Controls (Auto-Flight)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Flight Control Computer	FCC X	4	4	4	With FCC 1 and 4 and both SCEFCs operational, and no Pitch, Yaw, Roll, or Pitch Trim Fail Op messages illuminated, a one time flight to a station with repair capability at or below FL 200 is authorized.
Spoiler Control/Electronic Flap Computer	SCEFC X	2	2	2	With 1 inop and 4 FCCs operational, a one-time flight to a station with repair capability is authorized.
Electronic Flight Control Axis	Any EFCS Axis "FAIL" Light	5	5	5	
Alpha Limiter System	ALPHA LIMIT INOP	1	1	1	
Stall Warning System	STALL WARNING INOP	1	1	1	If one channel is failed, continue mission to a station with repair capability.
Stick Shaker		2	2	2	
Ground Proximity Warning System	GPWS/GPWS FAIL	2	1	1	If both inop, continue the mission to a station with repair capability. No low level contour flight is authorized.
Terrain Avoidance Warning System	TAWS/TAWS FAIL				
Auto Throttles		1	0	0	Vol 3 crew duty limits apply
Axis Fail Operation Modes	Roll, Yaw, or Pitch Fail Op		Req	Req	Do not takeoff with any axis fail op condition
Surface Fail Operation Modes	Aileron, flap, elevator, rudder, or slat Fail Op		Req		With any single surface fail op condition, continue mission to a station with repair capability.
System Fail Operation Modes	ALS, Pitch Trim, ADC Fail Op		Req		Continue the mission to a station with repair capability.
SCEFC THRTL FAIL	SCEFC THRTL FAIL		Req		A one-time flight to a station with repair capability is authorized.
Aileron Trim Actuator		1	1	1	
Flap Actuator Cylinder		8	8	7	All are required for Full-Flap operations.
Transducer, Flap Position		4	4	4	
Indicator, Flap Position		1	0	0	MFD indication will be operational.
Indicator, Speed Brake		1	0	0	MFD indication will be operational.
Trim Indicators, Aileron, Rudder, Horizontal Stabilizer		1	0	0	MFD indication will be operational.
Spoiler Assy & Actuator Cylinder		8	7	7	Will be failed retracted. All will be operational for ALZ operations.
Switch, Control, Direct Lift (DLC)		2	1	1	

Table 4.8. Flight Controls (Auto-Flight) (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Slat Actuator		16	14	14	One actuator per wing may be inop.
TOGA Button	TOGA Button Fail	1	1	1	
Aileron Actuator, Ratio Changer		1	1	1	
Aileron Actuator Cylinder Assembly		4	4	2	If inop, one time flight to a station with repair capability is authorized.
Transducer, RVDT, Stick, Roll		4	4	3	Four required for ALZ operations.
Module, Integrated Flight Control (IFCM), Rudder		2	2	2	With the upper IFCM inop, a one time flight to a station with repair capability is authorized.
Rudder Actuator Cylinder Assembly		4	2	2	One per surface may be inop. Four required for ALZ operations.
Elevator Actuator, Ratio Changer		1	1	1	
Autothrottle Disengage Switch		1	1	0	Required for A/R missions.
Module, Integrated Flight Control (IFCM), Elevator		4	4	4	
Cylinder Assembly, Elevator		8	6	6	Maximum of one failed cylinder per surface.
Transducer, Position, RVDT, Pitch		2	2	2	One channel in one RVDT may be inop.
Control Valve, Horizontal Stabilizer		2	2	2	
Horizontal Stab Pitch Trim Motor, Hydraulic		2	2	2	
Tandem Control Valve		4	4	4	
Air Refueling Mode	A/R MODE INOP		Req	Req	Continue to station with repair capability if no A/R planned.

Table 4.9. Fuel

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Valve Assembly, Solenoid, Fuel Vent, Override		2	0	0	Primary and secondary climb/dive valve will be operational.
Valve Assy, Secondary Climb/Dive		2	0	0	Primary climb/dive valve and override solenoid valve will be operational.
Valve Assy, Primary Climb/Dive		2	0	0	Secondary climb/dive valve and override solenoid valve will be operational.
Transfer Pumps		4	2	2	If fuel quantity in tank 2 or 3 is greater than 36K lbs, respective XFER pump will be operational. One transfer pump/switch per wing may be inop; tank with inop pump will have both boost pumps and crossfeed valve operational.

Table 4.9. Fuel (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Dump Valves		2	2	1	Left and Right Master, or Center separation valve, will be operational.
Boost Pumps		8	6	6	One per wing may be inop if inboard transfer pumps and crossfeed valves are operational on affected side.
Separation Valve		1	0	0	If failed closed, both A/R isolation valves will be operable.
Receptacle, Ground Refueling		2	1	1	
Panel, Control, Ground Refueling		1	1	0	
Valve, Isolation, Ground Refueling		2	0	0	Inop valve will be closed manually prior to takeoff
Fill Valve		4	4	2	Four required for A/R missions. Fill valves 1 and 4 will be operational. Over wing refueling is required for affected tanks.
Hi-Level Shutoff Test Valve		4	4	0	Four required for A/R missions. Quantity Select method required for ground refueling.
Ground Refuel Switch, Overhead Panel		2	0	0	Ground Refuel Panel will be operational
Crossfeed Valves		4	4	4	
Fuel Manifold Drain & Check Valves & Pump		1	1	0	May be inop but manifold must stay dry and have manifold drain capability
Valve, Drain, Manual, Ground Refueling		1	1	1	
Low-Level Fuel Dump Shutoff		4	4	4	
Fuel Quantity Computer		1	1	1	With one channel inop, one-time flight to a station with repair capability is authorized.
Fuel Quantity Display, Overhead Panel		4	4	3	Total fuel quantity indication will be operational.
Total Fuel Quantity Indicator		1	1	0	Required if any fuel quantity display inop.
UARRSI System		1	1	0	Required for A/R missions.
Door Assembly & Handle, UARRSI		1	0	0	Door will be verified open before flight for AR missions.
Air Refuel Master Valves		2	1	0	Inop valve will be manually closed prior to takeoff. With any inop valve, the center separation valve will be operable. One required for A/R missions.
Dimming Unit, A/R Annunciator		1	1	0	Required for night A/R missions.
Annunciator Lights, READY, DISC. & LATCHED, Center Post		1	1	0	For A/R missions READY light may be inop if overhead panel READY light is operational.

Table 4.9. Fuel (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Rheostat, Air Refuel Ann/Slipway, Overhead Panel		1	1	0	Required for night A/R missions.
Switch, L/R Master, DISAG, Air Refuel, Overhead Panel		2	1	0	Separation valve will be operable. Inop valves will be closed prior to takeoff. Required for A/R missions.
Switch, A/R Amp Override, Overhead Panel		1	0	0	Required if Override Boom Latching authorized by mission directive

Table 4.10. Hydraulics

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Engine Driven Hyd Pumps		8	8	6	Only one pump per system may be inop. One pump on systems #2 and #3 may be inop provided the AUX pump for affected system and transfer pump are operational. If a pump fails to depressurize, a one time flight to a station with repair capability is authorized.
Aux Pumps		4	4	3	If the failed pump is on #2 or #3 system the transfer pump will be operational. If failed pump is on #1 or #4, a one time flight to a station with repair capability is authorized.
Transfer Pump		1	1	0	If inop, all system 2 and 3 (engine driven and AUX) pumps will be operational
Hydraulic Panels	HYD PANEL SINGLE/INOP	2	2	1	Continue mission to a station with repair capability
Hydraulic System Controllers	HCU SINGLE/INOP	2	2	2	
Hyd Manifold Press Transducer		4	3	3	Associated pump low pressure light and temp indicator required
Hyd quantity transducer		4	0	0	Associated system reservoir low quantity prox sensor required
Hyd low quantity prox sensor		4	0	0	Associated system reservoir hydraulic quantity transducer required
Ram Air Turbine		1	1	1	Will be stowed prior to departure

Table 4.11. Indicating Systems

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Proximity Sensor Interface Unit (PSDAU, PIU)	PROX UNIT 1,2	2	2	2	
Computer, Central Aural Warning		1	1	1	
Loudspeaker, CAWS		2	1	1	
Computer, Warning and Caution - WCC		2	2	2	
Annunciator, Lighted, WACS Fail		2	0	0	
Switch, Master Warning & Reset		2	1	1	
Switch, Master Caution & Reset		2	1	1	
ELT		1	1	1	
Underwater Beacon		1	1	0	
Cockpit Voice Recorder		1	1	1	If inop, a one time flight to a station with repair capability is authorized.
Single Flight Data Recorder		1	1	1	If inop, a one time flight to a station with repair capability is authorized.

Table 4.12. Landing Gear and Brakes

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Wheel & Tire Assy, Main Gear		12	12	12	
Multiple Disk Brakes		12	10	10	
Brake Accumulator		2	2	2	
Control Unit, Antiskid-Brake Temp Monitor		1	1	1	
Transducer, Motional Pickup, Wheel Speed, MLG		12	10	10	Brakes (7 or 8) and (11 or 12) transducers will be operational. Brake on affected wheel will be capped.
Sensor, Temperature, Brake Monitor		12	8	8	One sensor per bogie may be inop.
Indicator, Brake Pressure, Cockpit		1	1	1	
Steering Cylinder Assembly		2	2	2	

Table 4.12. Landing Gear and Brakes (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Nosewheel Steering Control (Tiller)		2	2	2	With one inop, a one time flight to a station with repair capability is authorized. (The operable tiller will be in Pilot Flying position.)
Landing Gear Indicators		2	2	2	Accurate gear indication will be available on either CFG page or landing gear control indication panel. With one inop continue mission to a station with repair capability
Parking Brake	PARK BRAKE INOP	2	1	1	A one-time flight to a station with repair capability is authorized.

Table 4.13. Lighting

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Flight Compartment Lighting		1	1	1	Main inst panel floodlight, cockpit dome and thunderstorm lights will be operational for night flight.
Light and Buttons, Nurse Call		2	0	0	Will be operable for Aeromedical Evacuation missions
Cargo Compartment Lighting			req	req	Adequate lighting to perform mission.
Light, Landing and Taxi, Wingtip		2	1*	1	One wingtip or nose landing light on each side will be operational.
Nose Landing Light		2	1*	1	One wingtip or nose landing light on each side will be operational.
Nose Taxi Light		2	1	1	One may be inop provided the nose landing light on the same side is operational. Not required if mission conducted during daylight hours.
Wingtip Navigation Light, Fwd Position		2	2	2	One bulb per wing will be operational. (Note: there are 2 bulbs in each lighting assembly.)
Wingtip Navigation Light, Aft Position		4	2	2	One position light assembly per wing will be operational. (Note: there are 2 light assemblies with single white bulbs on each wing.)
Upper & Lower Anti-Collision, Beacon		2	2	2	See AFI 11-202 Vol 3 for requirements. For SPRO ops, lower light may be removed.
Tailcone In-Trail Light		2	0	0	One required for night formation flight.
Wing In-Trail Light		2	0	0	Two required for night formation flight. Wing tip position lights can be used as an alternate for training only.
Fuselage In-Trail Light		2	0	0	Two required for night formation flight.

Table 4.13. Lighting (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
A/R Flood and Spot Light		1	1	0	Required for night A/R.
UARRSI Perimeter Light Panel		3	3	0	Required for night A/R.
Emergency Exit Sign/Light		13	13	13	
Emergency Lighting, Battery Power Supply		3	3	3	
Wing Tip (Strobe) Recognition Lights		4	0	0	See AFI 11-202 Vol 3 for requirements

Table 4.14. Navigation Systems

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Pitot Static Probes	P/S XX MAST/HEAD HTR	4	3	3	Upper left (1A) and lower right (2A) probes will be operational to provide standby pitot static instruments
Standby Attitude Indicator		2	2	1	Pilot will have a full set of standby indicators.
Standby Altimeter Airspeed Indicator		2	2	1	Pilot will have a full set of standby indicators. Altimeter set function will be operational on both.
BDHI		2	2	1	Pilot will have a full set of standby indicators.
Air Data Computer Channels		4	4	3	With ADC1A inop, a one-time flight to a station with repair capability is authorized.
IRUs		4	4	3	Includes IRU batteries. See FCC inop guidance.
GPS		2	2	0	As required for ATC airspace restrictions
TACAN		1	1	0	As required for mission accomplishment
PLSR 1/2		2	2	2	
DME 1/2		2	1	1	As required for mission accomplishment
LF/ADF		1	0	0	As required for mission accomplishment
RADAR Altimeter		2	1	1	
Weather RADAR		1	1	0	Required for air refueling and when thunderstorms are forecast for the planned route of flight
IFF/TCAS		1	1	1	Mode 1, 2, 4, & TCAS may be inop based on msn/airspace requirements.

Table 4.14. Navigation Systems (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
CIP		2	2	2	
SKE		1	0	0	As required for mission accomplishment
MCD		4	4	3	
Data Entry Keyboard (MCK)		2	2	2	
HUD		2	2	1	5 of 6 displays (HUD/MFDs) will be operational. 2 req'd for ALZ/NVG.
MFD		4	4	3	5 of 6 displays (HUD/MFDs) will be operational.
MFC		2	2	2	
A/PDMC		2	2	1	

Table 4.15. Oxygen

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
25 liter Crew LOX Converter	CREW OXY LOW	1	1	1	May be inop if PAX and/or auxiliary system and crossfeed are operational.
75 liter PAX LOX Converter	OXY LOW	1	1	1	May be inop if auxiliary system is operational.
75 liter AUX Converter	OXY LOW	1	1	1	May be inop if passenger system is operational.
Regulators		10	3	3	Pilot, co-pilot, loadmaster regulators will be operational. Other regulator(s) required for each occupied crewmember position.
Portable Oxygen Bottles		9 (10)	9 (10)	6	Two minimum required for each primary crewmember. Ensure requirements of AFI 11-202 Vol 3, Table 6.1, are met. (10 bottles w/ TCTO 762)
Quick Don Mask		15	15	3	Required for each primary crewmember. Ensure requirements of AFI 11-202 Vol 3, Table 6.1, are met.

Table 4.16. Bleed Air

Item/System	Message/Cue/ Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Engine SOVs		4	2	2*	One SOV per wing may be inop provided flight is not conducted into known or forecast icing conditions. All components will be functioning on the operational bleed systems
Wing Isolation Valve		1	1	1	May be manually closed after engine start. If manually closed, two bleed sources required for each operating pack.
Pneumatic Ground Service Connector		2	0	0	APU required if ground service connector inop.
Sensing element, overheat detector		142	71	71	One loop will be operable per region
Wing Ice Prot Burst Duct Differential Pressure Switch		4	2	2	One per wing will be operable.
Cowl Ice Prot Burst Duct Differential Press Switch		8	4	4	One per engine will be operable

Table 4.17. Cargo Mission Systems (Airland)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Ramp Toes		4	4	0*	Will have both stowage pins in each toe. At least one of the ramp toes requires an operational proximity sensor. May have less than 4 operational toes if not needed for mission accomplishment.
Cargo Loading Stabilizer Struts		2	2	0*	Required to jack the aircraft. Mission may continue if struts are not needed for mission accomplishment. Continue to a station with repair capability.
Cargo Rail and Locks (ADS and Logistic)					As required for mission accomplishment.

Table 4.17. Cargo Mission Systems (Airland) (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Cargo Winch		1	1	0*	Mission may continue if winch is not needed for mission accomplishment.
Aircrew Data Transfer Device		1	1	0	

Table 4.18. Cargo Mission Systems (Airdrop)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
TRM		1	1	0	Required for equipment airdrop
Rail Bridge Assembly		1	1	0	Required for equipment airdrop
Ramp Edge Covers		1	1	0	Required for equipment airdrop
Retrieval Winches		2	2	0	As required for CDS or personnel airdrop
GRM		6	6	0	As required for CDS airdrop
BSA		1	1	0	Required when dropping CDS > 9400 lbs.
Canadian Retrieval System		2	2	0	As required for personnel airdrop
Paratroop Doors		2	2	0	As required for personnel airdrop
Air Deflector Doors/Pod Fairings		2	2	0	As required for personnel airdrop
ADSC		1	1	1	All associated components for airdrop are required.

Table 4.19. Doors

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Crew Entrance Door	"ENTRY DOOR"	1	1	1	Indicating systems will be operational.
Emergency Exit	"EMERG EXIT"	1	1	1	
Crew Entry, Emergency Exit, Hor/Vert Stab Access, Crew Oxygen, Belly Maintenance Door Proximity Indicating Systems					May be inop if the door is visually verified closed and locked.
Cargo Ramp Latches/Locks		22/2	22/2	22/2	All cargo ramp latches and electrical safety locks will be operational. Manual operation permissible, unless aeromed or airdrop.

Table 4.19. Doors (Cont)

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Cargo Door/Ramp Proximity Indicating Systems					All proximity sensors and indicating systems affecting the ADSC, LFCP, LACP, and PADS will be operational for airdrop missions. All proximity sensors and indicating systems associated with the cargo door system will be operational. May be inop on unpressurized flights if it can be determined that the locks are positively locked. But, with palletized cargo on board, all door/ramp locks are required to permit cargo jettison.
Cargo Door Downlock Assemblies		2	2	2	
Sidewall Jamb Spindles		34	34	34	
Cargo Door Ditching Locks		4	4	4	Cargo door, ramp, and ditching locks will be operational (without the use of manual override). Manual override procedures may be used to continue the mission to a repair facility. Cargo door, ramp, and ditching locks will be operational (without the use of manual override) for all missions that require in-flight use of cargo door and ramp.
Cargo Door Uplocks		2	2	2	
Cargo Ramp		1	1	1	All cargo ramp latches and electrical safety locks will be operational.
Paratroop Doors		2	2	0	As required for mission accomplishment
Air Deflector Doors/Pod Fairings		2	2	0	As required for mission accomplishment

Table 4.20. Engines/APU

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
Engines		4	4	4	
EEC	EEC FAULT X	4	4	4	One channel (A or B) may be inop. If channel A is inop, engine will operate in N1 mode.
Ignition System		8	8	4	One ignition source per engine may be inop. Only 1 engine may have CH A inop—one time flight to a station with repair capability is approved.
TCA Valve	ENG STABILITY X	4	0	0	Valve will be locked open if inop.
EGT Thermocouple Probes		24	20	20	6 probes per engine, 5 required; 2 channels per engine, 1 required.
SED		1	1	1	
Thrust Reversers		4	2	0*	Inop TRs will be locked out in symmetrical pairs.
Oil Quantity Transmitter	ENG OIL ABNORMAL	4	0	0	Oil pressure and temp indications will be operational. Verify oil quantity prior to flight.
Low Oil Pressure Switch	ENG OIL PRESSURE	4	4	4	Monitor oil pressure on MFD.
Starter Control Valve		4	4	4	Starter control valve will be operable manually. For manual operation, starter position indicator must be operable.
APU		1	1	0	APU will be operational for any mission departure into a field without alternate electric/air sources when engine shutdown is planned.

Table 4.21. Emergency Equipment

Item/System	Message/Cue/Alert	Installed	Required		Notes/Limitations/Exceptions
			A	B	
FEDS Life Rafts (includes Retractor Assembly and Ladders)		3	3	0	Raft quantity will be adequate to accommodate total persons onboard (46 per raft) when flight exceeds power off gliding distance from land.
FEDS Initiators		7	7	6	All required for flights exceeding power off gliding distance from land. Exterior initiator is required at all times.
Fire Extinguishers		9	9	9	
Crash Axes		2	2	2	
Ramp Blow Down System		1	1	0	Required for Aeromedical Evacuation Missions

Chapter 5

OPERATIONAL PROCEDURES

5.1. Checklists. A checklist is not complete until all items have been accomplished. Momentary hesitations for coordination items, ATC interruptions, and deviations specified in the flight manual, etc., are authorized. Notes amplifying checklist procedures or limitations may be added to the checklists (in pencil).

5.1.1. Checklist Inserts. Units may supplement T.O. guidance with HQ AMC/DOV approved checklist inserts. These inserts may be placed at the end of the appropriate checklist or in an in-flight guide. All checklist inserts must have a POC.

5.1.2. If any crew member has recommendations or change to the Checklist Insert, contact the POC. The POC will consolidate inputs and submit changes to HQ AMC/DOV for approval. Local in-flight guides and inserts not affecting T.O. guidance and procedures may be locally developed and OGV approved.

5.2. Duty Station. A qualified pilot will be in control of the aircraft at all times during flight. **EXCEPTION:** Unqualified pilots undergoing qualification training and senior staff members who have completed the ATS Senior Officer Course under the direct supervision of an instructor pilot. The aircraft commander, copilot, and loadmaster will be at their duty stations during critical phases of flight:

5.2.1. During other phases of flight, crew members may leave their duty station for brief periods to meet physiological needs and to perform normal crew duties. Only one pilot may be absent from their duty station at a time. Notify the aircraft commander before departing assigned primary duty station. **EXCEPTION:** On augmented AR missions when two or more air refuelings are scheduled and the crew contains more than one air refueling qualified aircraft commander, an aircraft commander (not necessarily the "A" coded aircraft commander on the flight orders) must be in the seat during refueling operations.

5.3. Flight Station Entry. Aircraft commanders may authorize passengers and observers access to the flight station during any phase of flight. In all cases, sufficient oxygen sources must be available to meet the requirements of AFI 11-202V3. Passengers and observers will not be permitted access to primary crew duty station regardless of its availability.

5.4. Takeoff and Landing Policy. After thoroughly evaluating all conditions, the aircraft commander will determine who accomplishes the takeoff and landing and occupy either the left or the right seat during all takeoffs and landings.

5.4.1. A qualified aircraft commander will accomplish all approaches and landings under actual emergency conditions unless specific conditions dictate otherwise.

5.4.2. Aircraft commanders who possess less than 100 hours in command since certification in the C-17 will perform all takeoffs and landings from the left seat.

EXCEPTION: They may allow aircraft commanders (with more than 100 hours in command), or higher to perform takeoffs and landings when required for currency.

Chapter 24

NIGHT VISION GOGGLE OPERATIONS (NVG)

24.1. General. This chapter provides guidance for C-17 NVG operations. It is applicable to all C-17s required to perform missions employing NVGs. Where not specifically stated in this chapter, all operational restrictions for operations are identical to those contained in the other chapters of AFI 11-2C-17V3. AFI 11-2C-17V3, Addenda B provides guidance for SOLL II operations and training; where not specifically stated in that addenda, all operational restrictions for operations are identical to those contained in this and the other chapters of AFI 11-2C-17V3. NVGs are a tool for enhancing situational awareness in the low-light environment. Crewmembers should use all means available (autopilot, flight instruments, navigational systems) to maintain situational awareness. Because NVGs do not turn “night into day,” crewmembers must be aware of the limitations of NVGs.

24.2. Training/Operations. Accomplish aircrew training according to AFI 11-2C-17V1 and MAJCOM approved training guides before NVG use. SOLL II crews will complete basic NVG training (including airdrop) in addition to SOLL II training. SOLL II crews will only use SOLL procedures on designated SOLL missions with SOLL-trained crews.

24.2.1. Pilots shall only perform NVG approaches on training missions and operational missions when the OPOD, mission directive or tactical situation dictates.

24.2.2. Pilots may use NVGs even if the loadmaster on the crew is not NVG certified, provided no NVG ground operations are planned/required. During contingency operations, all crew members should be NVG qualified.

24.2.2. Air Refueling. Pilots may use NVGs during air refueling rendezvous to acquire the tanker but must remove goggles NLT one nautical mile from the tanker.

24.2.3. Touch-and-Go landings on NVGs are authorized IAW Chapter 9 of this regulation.

24.3. Mission Planning. Pilots require one full day of planning for any missions employing NVGs in the low-level environment. Route selection and mission planning techniques and procedures should incorporate strategies for enroute climbs and descents to optimize night terrain usage for threat avoidance. A leg segment should not be less than 10 NMs in length to minimize unnecessary altitude changes.

24.4. Weather Minimums. Use of NVGs in IMC is prohibited. Other weather limitations are IAW this instruction and AFI 11-202V3. NVGs have inherent limitations which can further be reduced by poor weather conditions. Crews will consider weather conditions, moon illumination and position, sky glow at dawn and dusk, cultural lighting, and weapon/expendable effects when planning NVG operations.

24.4.1 Wind Limitations. When using NVGs for landing, the maximum allowable crosswind component is 30 knots, however OG/CC (or equivalent) approval is required to exceed 20 knots.

24.5. Minimum Operational Equipment. The following equipment is required for NVG operations (in addition to Chapter 4):

24.5.1. NVGs that are HUD compatible (F4949G or L) mounted on a standard aircrew helmet. One spare set of NVGs per crew. Each crewmember will carry approved spare batteries for their own NVGs. All crewmembers will preflight their own NVGs prior to flight. The spare will also be preflighted.

24.5.2. For missions that will require takeoff/landing on NVGs, the two wingtip landing lights will have infrared (IR) filters installed. Both will be operational for launch. If, after departure, one of the IR filtered landing lights fails, the mission may be made continued at the AC's discretion. Consideration should be given to using the overt taxi lights if the runway/ALZ can be lit normally (threat permitting). Divert to an alternate location if landing with one IR landing light isn't feasible.

24.5.3. An operational HUD is required in both pilot positions to conduct NVG operations.

24.5.4. One radar altimeter.

24.5.5. Cargo compartment red lights or MAJCOM-approved NVG lighting.

24.5.6. Each pilot will carry a NVG-compatible flashlight, personal lip/finger light (as desired), and/or Chem lights.

24.6. Aircraft Preparation. In addition to the normal aircraft preflight, crewmembers may have specific tasks to prepare the aircraft for NVG missions. Additional equipment may be necessary to prepare the aircraft and crewmembers for missions that utilize NVG operations.

24.6.1. Aircraft Kit.

24.6.1.1. IR filters for landing lights (mandatory on all NVG missions).

24.6.1.2. Porthole covers. (Blacked out requirement only)

24.6.1.3. Tape. (Blacked out requirement only)

24.7. Aircraft Lighting

24.7.1. During combat/contingency operations, the tactical situation may dictate the use of all, some, or none of the aircraft exterior lights as determined by the mission commander. Lights-out operations during peacetime will be conducted in warning or restricted areas IAW AFI 11-202V3 unless a letter of agreement exists with the FAA. Use the following guidance for aircraft exterior lighting configurations when operating outside of these areas.

24.7.1.1. Navigation Lights: Steady, bright.

24.7.1.2. Formation Lights: On, medium (formation operations only).

WARNING: Immediately discontinue use of NVGs, and/or increase spacing from preceding aircraft (if possible), when exterior lights in a preceding aircraft create excessive distractions or degrade performance of NVGs to the point where safe flying operations cannot be maintained.

24.7.1.3. Anti-Collision: On, lower (upper and lower for single ship operations or for the last aircraft in the formation unless it causes distractions).

24.7.1.4. Landing lights. IR landing lights will be turned on no later than 400' AGL on final.

24.8. NVG Donning/Doffing Procedures.

24.8.1. Donning and doffing of NVGs will be initiated by the aircraft commander through the use of the Combat Entry/Exit Checklist or as briefed. If in formation, donning and doffing times will be determined in the formation briefing. For non-NVG landings, cease NVG usage 5 minutes prior to landing to regain adequate night visual acuity. Normally, NVGs will be doffed during the Combat Exit Checklist.

24.9. NVG Enroute Procedures.

24.9.1. Inadvertent Weather Penetration Procedures. Undetected meteorological conditions represent one of the most dangerous conditions facing a crew using NVGs. The onset of 'scintillation', a loss of scene detail, or a change in the appearance of halos represent three of the best clues to the possibility of inadvertent weather penetration. If IMC conditions are encountered, crews will cease NVG use until VMC conditions can be attained. If appropriate, execute Inadvertent Weather Penetration Procedures IAW **Chapter 18** of this instruction.

24.10. NVG Airland. Use of NVGs for airland operations is a tactical event. See Chapter 3 of this regulation for restrictions. NVG airland pilots are authorized to takeoff and land on runways meeting the requirements in Chapter 5.

NOTE 1: NVG airdrop pilots that are not NVG airland qualified may use NVGs for ALZ/airfield acquisition. The pilot flying the approach and landing will remove NVGs no later than 5 minutes prior to landing. The PNF will remove NVGs as soon as the ALZ is acquired but no later than glideslope intercept.

NOTE 2: ALZ lighting patterns will be IAW AFI 13-217. The AC must ensure landing TOLD data reflects the possibility for a landing at the end of the zone (subtract landing/safety zone distances from runway available to ensure adequate runway exists for rollout).

24.10.1. Radar Marker. The radar markers should remain set at enroute altitude setting IAW the Combat Entry Checklist until the slowdown for airland maneuver. Once the Approach Checklist is initiated, the radar altimeter may be reset to assist in landing.

24.10.2. NVG Approaches and Landings.

24.10.2.1. Visual Approaches. Since the primary threat avoidance tactic employed by landing on NVGs is making the aircraft hard to see, arrival tactics will involve less aggressive maneuvering for a given threat than would be accomplished during the day or "lit up" at night. NVG visual approaches will be flown to no less than a 1.5 mile final, and intercept target approach path angle at no lower than 500 AGL. Consider aircraft weight and its effect on the approach. The first pilot to acquire the landing zone will state "Pilot/Copilot has the LZ". The next pilot to acquire the zone will announce "Pilot/Copilot has the LZ at (state clock position)". Use automation as appropriate to reduce pilot workload.

24.10.2.2. Instrument Approaches. Use of NVGs is permitted during instrument approaches flown in VFR conditions.

24.10.2.3. Assault landings. Assault landings on NVGs are prohibited. Assault landing procedures are required when the mission computer TOLD derives a ground roll versus a landing distance. Full flap landings using TOLD where landing distance is generated in the mission computer require thorough understanding of TOLD assumptions (TCH, braking, and thrust reverser use).

24.10.3. Go-Around and Departure Procedures. Whether maneuvering for another approach or proceeding with the mission, fly as high as operational requirements allow, and no lower than enroute or pattern altitude.

CAUTION: Pilots are especially susceptible to spatial disorientation during NVG go-arounds and departures.

24.10.4. Ground Operations.

24.10.4.1. Lighting. Operating landing/taxi lights with IR filters for more than 5 minutes on the ground will cause damage to the lights/filters.

24.10.4.2. ERO. Reduced light EROs must be accomplished with red (overt) lighting in the cargo compartment sufficient to permit MHE drivers to see marshaller's signals and safely position MHE and maneuver the load behind the aircraft without use of NVGs. (Dimming rheostat set no lower than nine to ten o'clock). LMs may use NVGs to maintain situational awareness of the load team behind the aircraft before or after actual loading.

24.10.4.3. Taxi/backing. Pilots may taxi using NVGs on airfields without lights (blacked out) or equipped with overt or covert lights. If taxiing or accomplishing ground ops on blacked out taxiways/runways/ramps, the Aircraft Commander will ensure aircraft or environmental lighting provides for clear definition of taxiway/runway/ramp edge. Comply with all taxi restrictions in Chapter 5 and the Airfield Suitability and Restrictions Report. The LM may provide the pilot with directions to taxi the aircraft while using NVGs.

24.10.4.4. Combat Offloads. Pilots and LMs may accomplish Combat Offloads on NVGs at light levels up to and including blacked out provided aircraft or airfield lighting permit clear definition of taxiway/runway/ramp edges.

24.11. NVG Airdrop Procedures. Qualified NVG airdrop pilots are authorized to perform normal night operations (including low level flying and formation) at night VMC altitudes IAW Chapters 18 and 19 of this regulation. Airdrops may be accomplished on drop zones lit IAW AFI 13-217 lighting patterns (covert and overt) while wearing NVGs, to include unmarked drop zones. Mission requirements will dictate the release method used.

24.11.1. Loadmasters will use NVGs during airdrops if the mission dictates. Loadmasters are authorized to perform heavy equipment and container delivery system airdrops with minimum lighting. Use NVGs as necessary to assist with operations and keep cargo area lighting to a minimum. During static line personnel operations, use of

NVGs in the cargo compartment is not authorized; however, use of NVGs on the flight deck is authorized.

24.11.2. Checklist Usage. Follow checklists and procedures in **Chapter 19** of this AFI.

24.11.3. Cargo Compartment Lighting. After the Combat Entry Checklist, all cargo compartment lighting will be switched to red lights. Blacked out (no-light) operations in the cargo compartment are not authorized. Adjust red light intensity to between the nine and ten o'clock position. Loadmasters will carefully consider cargo compartment lighting intensity prior to opening ramp and door to minimize interference with formation wingmen's NVG vision.

24.12. NVG Formation Procedures.

24.12.1. Rejoin Procedures. NVG formation rejoins will be IAW **Chapter 18** of this AFI. Formation rejoin altitude will be no lower than MSA. Coordinate for exterior lighting and/or SKE procedures as required.

24.12.2. Landing. Obtain spacing for landing prior to descending from enroute altitude.

24.13. NVG Emergency Procedures. Crews will review and coordinate NVG failure procedures for all phases of the mission. The PNF will be ready to immediately assume aircraft control if the PF experiences spatial disorientation or an NVG malfunction. During cargo compartment emergencies, return to normal lighting until the emergency is resolved. Discuss actions for Smoke and Fumes in the aircraft.

24.13.1. Enroute Flight through Completion of Slowdown.

24.13.1.1. Single-ship or formation lead. For enroute operations, if either pilot's NVGs become inoperative, transfer aircraft control to the other pilot, and transition to a spare set. If the difficulty cannot be corrected, terminate NVG operations.

24.13.1.2. Formation wingmen. Maintain formation position if able. Transfer aircraft control and transition to a spare set of NVGs. Maintain enroute spacing from other aircraft in the formation until the problem is resolved and continued safe low-level operations can be ensured. If the difficulty cannot be corrected, terminate NVG operations, notify lead and exit the formation.

24.13.2. Slowdown through Escape.

24.13.2.1. Single-ship and formation lead. If either pilot's NVGs become inoperative, continuing the airdrop will be at the aircraft commander's discretion. As a guide, if the DZ is in sight and CARP alignment has been confirmed between the PF and the PNF, the airdrop may be continued.

24.13.2.2. Formation wingmen. Maintain formation position if able. Notify lead when appropriate. Transfer aircraft control if appropriate and transition to a spare set. Maintain drop spacing from other aircraft in the formation until the problem is resolved and continued safe airdrop operations can be ensured. If the difficulty cannot be corrected, terminate NVG operations, exit the formation and execute a no-drop. Use SKE to the max extent possible for formation situational awareness.

24.13.3. NVG Takeoff. During an NVG takeoff, if the PF experiences NVG failure takeoff may be continued at the discretion of the aircraft commander; otherwise an abort will be initiated. Consider using the overt nose lights to continue the takeoff. If NVG malfunctions occur after Vgo, takeoff will be continued with the other pilot assuming control of the aircraft if necessary. If either pilot's NVGs fail after takeoff, continue the climbout and follow the appropriate procedures for loss of NVGs. Strong consideration should be given to continuing flight on autopilot.

24.13.4. Approach and Landing. If the pilot or copilot experience NVG failure or other malfunctions occur prior to touchdown, perform a go-around. If the PF's NVGs fail during or after touchdown, transfer control to the PNF for the landing rollout. Consider using the overt nose lights.

24.14. Aircraft Preparation. The cockpit of the C-17A is specifically designed for NVG operations and little preparation is required for flights requiring NVGs. During exterior walk around inspection, a pilot will ensure all wheel well inspection lights are turned off and necessary exterior IR lighting is installed.

24.14.1. Loadmaster Aircraft Preparation. Taping of lights may be accomplished, however, no more than one layer of tape will be used. The Jump Signal Annunciators will not be taped. (EXCEPTION: For blacked-out or covert operations, a maximum of three layers of tape may be used. Jump Signal Annunciators will not be taped.)

NOTE: The use of mini-chemical lights or tape to mark/identify switches and/or equipment may be used as required.

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Chapter 25

NAVAL EMERGENCY AIR CARGO DELIVERY SYSTEM (NEACDS)

25.1. General. NEACDS is designed for C-17 aircraft to airdrop emergency supplies to ships at sea.

25.2. NEACDS Operational Requirements.

25.2.1. C-17 crews will, as a minimum:

25.2.1.1. Carry Navy Numerical Code (AMCS 608 NUCO) encode and decode tables and Navy voice call sign listing (AKAI 16 VSCL). Additional terms/codes are found in Joint Command Manual 55-200, AFR 3-16, and JCS Pub 1.

25.2.1.2. Carry binoculars to aid in ship recognition.

25.2.1.3. Carry operational brevity codes contained in Attachment 2 of this chapter.

25.2.2. Drop Zone (DZ). DZ selection, criteria, and markings for airdrop to land targets are not applicable for NEACDS. The target ship determines the DZ axis and point of impact (PI). Drop axis allows for downwind drop based on surface winds. The PI is determined on ship recovery capabilities but in no case will be closer than 500 yards abeam and 1,000 yards beyond target ship.

25.2.3. Restrictions include: radar altimeter must be operational prior to departure. If the objective area altimeter setting is unreliable or unavailable and the radar altimeter fails, the mission will be aborted. Radar must be operational prior to departure. Minimum drop altitudes are in accordance with AFI 11-231. Do not perform airdrops more than 1500 feet above ground level.

25.2.4. Prohibited operations: Multiple platform drops. (Airdrops of more than one platform or bundle per pass.), Overflight of ships with doors open, and formation drops.

25.3. Mission Planning.

25.3.1. Obtain the following information: Load configuration (number of loads, type load, load weight, and type parachutes); Drop altitude and airspeed; Forecast weather en route and in the objective area (includes cloud coverage and surface winds); Estimated drop axis; Rendezvous time; Minimum loiter time (loiter does not include search time); Maximum loiter time; Estimated ship's position at rendezvous time; Ship's state at rendezvous time (stationary or underway); Ship's description (call sign, type of ship, hull number, and photograph); Radio frequencies available (primary and secondary).

25.3.2. Use the fuel planning section, blocks 1 through 13, on AF Form 4081, **Flight Plan and Record**.

25.3.3. Fuel requirements. Complete AF Form 4081 except as follows:

25.3.3.1. Item 1. Time and fuel from takeoff to overhead the target ship.

25.3.3.2. Item 4. Use 20 minutes and 2,000 pounds of fuel.

25.3.3.3. Item 5 (loiter). Provide time between airdrops for ship retrieval efforts. Unless more time is specified, plan 30 minutes for the initial drop and for subsequent drops. For planning purposes, initial loiter begins 20 NM at 4,000 feet and includes the remaining descent and low level